Emerging role of deep learning■based artificial intelligence in tumor pathology

Abstract

The development of digital pathology and progression of state■of■the■art algorithms for computer vision have led to increasing interest in the use of artificial intelligence (AI), especially deep learning (DL)■based AI, in tumor pathology. The DL■based algorithms have been developed to conduct all kinds of work involved in tumor pathology, including tumor diagnosis, subtyping, grading, staging, and prognostic prediction, as well as the identification of pathological features, biomarkers and genetic changes. The applications of AI in pathology not only contribute to improve diagnostic accuracy and objectivity but also reduce the workload of pathologists and subsequently enable them to spend additional time on high■level decision■making tasks. In addition, AI is useful for pathologists to meet the requirements of precision oncology. However, there are still some challenges relating to the implementation of AI, including the issues of algorithm validation and interpretability, computing systems, the unbelieving attitude of pathologists, clinicians and patients, as well as regulators and reimbursements. Herein, we present an overview on how AI■based approaches could be integrated into the workflow of pathologists and discuss the challenges and perspectives of the implementation of AI in tumor pathology.